

CLAIMS

What is claimed is:

1. A test contactor mounted to a test Printed Circuit Board (PCB) for testing a device under test (DUT), the test contactor comprising:
 - a. a conductive housing inserted into at least one fixing hole formed at the test PCB;
 - b. a conductive spring mounted in the housing; and
 - c. a conductive probe having a bottom and a tip, and contacted with one end of the conductive spring inside the housing by the bottom and with one of electrode pads of the DUT by the tip,
 - d. wherein the tip of the conductive probe is projected outside the test PCB to come into contact with the electrode pads of the DUT when the test contactor is inserted into said at least one fixing hole of the test PCB.
2. The test contactor as claimed in claim 1, wherein the conductive probe includes the tip contacted with the electrode pad of the DUT, the bottom contacted with the one end of the conductive spring inside the housing, and a locking projection projected between the tip and the bottom in a radial outward direction.
3. The test contactor as claimed in claim 2, wherein the conductive spring provides an elastic force to direct the conductive probe toward the DUT in the housing, both ends of the conductive spring being contacted with a bottom of the housing and the bottom of the conductive probe, respectively.
4. The test contactor as claimed in claim 3, wherein the housing comprises a hollow conductive shell shape in which one end thereof facing toward the DUT is opened and the other end is closed in whole or in part, at least one of two ends of the housing being formed with an insertion restraint step for preventing the housing from being released from the fixing hole of the test PCB or from being inserted into the fixing hole excessively.
5. The test contactor as claimed in claim 4, wherein the insertion restraint comprises an annular flange shape projected along an outer circumference of any one of the ends of the housing in a radial outward direction, and has a diameter larger than a diameter of the fixing hole.

6. The test contactor as claimed in claim 3, wherein the housing comprises a hollow conductive shell shape in which one end thereof facing toward the DUT is opened and the other end is closed in whole or in part, the one end of the housing being formed with a stopper projected in a radial inward direction in order to prevent a conductive probe from escaping from the housing by causing a locking projection of the conductive probe to be locked to the stopper.
7. A test Printed Circuit Board (PCB) for testing a microwave device, comprising:
 - a. at least one fixing hole formed at a position equal to that of the test PCB on which the microwave device is to be mounted;
 - b. a predetermined circuit pattern formed on at least one of both surfaces of the test PCB so as to test performances of the microwave device; and
 - c. at least one test contactor mounted in the fixing hole and contacted with a corresponding electrode pad of the microwave device,
 - d. wherein the test contactor comprises: a conductive housing inserted into the fixing hole; a conductive spring mounted in the conductive housing; and a conductive probe having a tip and projected from the conductive housing to come into contact with the electrode pad of the microwave device.
8. The test PCB as claimed in claim 7, wherein an inner surface of the fixing hole and a periphery of the fixing hole of the PCB are plated with a conductive material.
9. The test PCB as claimed in claim 7, wherein the circuit pattern of the test PCB is made of a conductive material and covered with a corrosion resistant metal in order to prevent corrosion.
10. The test PCB as claimed in claim 7, wherein at least one additional substrate having a predetermined circuit pattern is additionally bonded on one surface of the test PCB spaced away from the microwave device.
11. The test PCB as claimed in claim 7, wherein the conductive probe includes the tip contacted with the electrode pad of the microwave device, the bottom contacted with the

one end of the conductive spring inside the conductive housing, and a locking projection projected between the tip and the bottom in a radial outward direction.

12. The test PCB as claimed in claim 11, wherein the conductive spring provides an elastic force to direct the conductive probe toward the microwave device in the conductive housing, both ends of the conductive spring being contacted with a bottom section of the conductive housing and the bottom of the conductive probe, respectively.
13. The test PCB as claimed in claim 12, wherein the conductive housing takes a hollow conductive shell shape in which one end thereof facing toward the microwave device is opened and the other end is closed in whole or in part, at least one of two ends of the conductive housing being formed with an insertion restraint step for preventing the conductive housing from being released from the fixing hole of the test PCB or from being inserted into the fixing hole excessively.
14. The test PCB as claimed in claim 13, wherein the insertion restraint step takes an annular flange shape projected along an outer circumference of any one of the ends of the conductive housing in a radial outward direction, and has a diameter larger than a diameter of the fixing hole.
15. The test PCB as claimed in claim 12, wherein the conductive housing takes a hollow conductive shell shape in which one end thereof facing toward the microwave device is opened and the other end is closed in whole or in part, the one end of the conductive housing being formed with a stopper projected in a radial inward direction in order to cause a locking projection of the conductive probe to be locked at the stopper, so that the conductive probe is prevented from escaping from the conductive housing.
16. The test PCB as claimed in claim 11, wherein an inner surface of the fixing hole and a surface of the test PCB surrounding the fixing hole are plated with a conductive material, one end of the fixing hole facing toward the microwave device being provided with a probe stopper, which is projected in a radial inward direction in order to allow the locking projection of the conductive probe to be locked.

17. A method for fabricating a test Printed Circuit Board (PCB) for testing a microwave device, comprising the steps of:
 - a. forming at least one fixing hole at a desired position of a dielectric substrate for the test PCB to coat a conductive material around the fixing hole;
 - b. forming a circuit pattern on the dielectric substrate, the circuit pattern being needed to perform testing; and
 - c. inserting a test contactor into the fixing hole, the test contactor having a probe, a spring and a housing.
18. The method as claimed in claim 17, further comprising a step of (d) bonding at least one additional substrate having a predetermined circuit pattern on one surface of the test PCB spaced away from the microwave device after the test PCB is fabricated by steps (a) to (c).
19. The method as claimed in claim 18, wherein step (d) comprises the sub-steps of:
 - d-1. arranging the additional substrate having the predetermined circuit pattern on one surface of the test PCB spaced away from the microwave device after the test PCB is fabricated by steps (a) to (c);
 - d-2. arranging an non-adhesive auxiliary substrate on the other surface of the test PCB opposite to the additional substrate to bond the additional substrate to the test PCB by hot pressing of the additional substrate, the test PCB and the auxiliary substrate; and
 - d-3. removing the auxiliary substrate from the test PCB.
20. The method as claimed in claim 17, wherein step (b) further comprises a step of coating a corrosion resistant metal on the circuit pattern in order to prevent corrosion.
21. The method as claimed in any one of claims 17 to 20, wherein:
 - a. the test contactor includes a conductive housing inserted into at least one fixing hole formed at the test PCB, a conductive spring mounted in the housing, and a conductive probe having a bottom and a tip and contacted with one end of the spring inside the housing by the bottom and with one of electrode pads of the microwave device by the tip; and

- b. the tip of the probe is projected outside the test PCB to come into contact with the electrode pad of the microwave device when the test contactor is inserted into the fixing hole of the test PCB.
22. The method as claimed in claim 21, wherein the probe includes the tip contacted with the electrode pad of the microwave device, the bottom contacted with the one end of the spring inside the housing, and a locking projection projected between the tip and the bottom in a radial outward direction.
23. The method as claimed in claim 21, wherein the spring provides an elastic force to direct the probe toward the microwave device in the housing, both ends of the spring being contacted with a bottom of the housing and the bottom of the probe, respectively.
24. The method as claimed in claim 23, wherein the housing takes a hollow conductive shell shape in which one end thereof facing toward the microwave device is opened and the other end is closed in whole or in part, at least one of two ends of the housing being formed with an insertion restraint step for preventing the housing from being released from the fixing hole of the test PCB or from being inserted into the fixing hole excessively.
25. The method as claimed in claim 24, wherein the insertion restraint step takes an annular flange shape projected along an outer circumference of any one of the ends of the housing in a radial outward direction, and has a diameter larger than a diameter of the fixing hole.
26. The method as claimed in claim 23, wherein the housing takes a hollow conductive shell shape in which one end thereof facing toward the microwave device is opened and the other end is closed in whole or in part, the one end of the housing being formed with a stopper projected in a radial inward direction in order to cause a locking projection of the probe to be locked at the stopper, so that the probe is prevented from escaping from the housing.
27. The method as claimed in claim 22, wherein in step (a), one end of the fixing hole facing toward the microwave device is further formed with a probe stopper, which is projected

in a radial inward direction in order to allow the locking projection of the probe to be locked.